Exemption No. 6104

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056

In the matter of the petition of

Southwest Airlines Co.

for an exemption from §§ 25.853(c) and 121.312(a)(2) of the Federal Aviation Regulations

Regulatory Docket No. 28106

GRANT OF EXEMPTION

By letter SWA-95-010 dated February 8, 1995, Mr. Stan Williams, Director of Quality Control, Southwest Airlines Co., Maintenance Operations Center, 2832 Shorecrest Drive, Dallas, Texas, petitioned for an exemption from the peak heat release requirements of § 25.853(a) as specified in Part IV of Appendix F part 25, and § 121.312(a)(2) of the Federal Aviation Regulations (FAR). In a subsequent letter, SWA-95-024, dated March 27, 1995, Mr. Jim Sokol, QC Support Manager, Southwest Airlines Co., provided additional information regarding test results from heat release rate and smoke emissions testing on two sets of ceiling panels with different sound dampening tapes. One of the test results revised a result contained in the earlier February 8, 1995, letter.

Sections of the FAR affected:

Section 25.853(c) (formerly § 25.853(a-1)) states, "For airplanes with passenger capacities of 20 or more, interior ceiling and wall panels (other than lighting lenses), partitions, and the outer surfaces of galleys, large cabinets and stowage compartments (other than underseat stowage compartments and compartments for stowing small items, such as magazines and maps) must also meet the test requirements of parts IV and V of appendix F of this part, or other approved equivalent method, in addition to the flammability requirements prescribed in paragraph (a) of this section."

Paragraph g of part IV of appendix F to part 25 states, in pertinent part, "The average total heat release must not exceed 65 kilowatt-minutes per square meter, and the average peak heat release rate must not exceed 65 kilowatts per square meter."

Paragraph b of part V of appendix F to part 25 states, in pertinent part, "The specific optical smoke density (D_S), which is obtained by averaging the reading obtained after 4 minutes with each of the three specimens, shall not exceed 200."

Section 121.312(a)(2) states, "All airplanes manufactured on or after August 20, 1990, must comply with the heat release rate and smoke testing provisions of § 25.853(a-1) in effect on September 26, 1988."

The petitioner's supportive information is as follows:

> "SWA requests that the slightly higher 67.69 peak heat release rate [note: this figure was revised to 68.9 in the second Southwest Airlines letter] of the subject tape be acceptable for installation on the aircraft listed in this document. The tape was inadvertently installed by the Boeing Company on the sculptured ceiling panels of several SWA Boeing 737-300 aircraft.
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> "The subject tape is a seven (7) inch wide, 17 millimeters thick material covering only about 9.2% of the cabin area. The data extracted from the burn tests accomplished by the Boeing Company in accordance with F.A.R. 25.853(a) was reviewed. The test data revealed that the tape met all of the 65/65/200 burn test requirements with the exception of the peak heat release requirement of 65 kilowatts per square meter. The subject tape exhibited only a slightly higher peak heat release rate of 67.69 kilowatts per square meter. It should be noted that this tape was installed as standard equipment on all Boeing 737-300 aircraft delivered new to SWA prior to August 20, 1990.
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> "The estimated cost of manhours and materials to remove the tape from the affected aircraft is $283,000.00. The SWA Remain Overnight (RON) aircraft are not scheduled out of service for a sufficient length of time to accomplish the tape removal. It is estimated that each affected aircraft would require an addition of five hours of scheduled inservice time to complete. The cost of lost inservice time for each aircraft would be approximately $10,000.00. The estimated cost to SWA for all forty-two (42) affected aircraft would be approximately $420,000.00. In light of the difficult economic environment Part 121 air carriers find themselves in today, the cost outlined above would ultimately be born by the traveling public. The approximately 200 canceled flights that would be generated by removal of the tape would place an unnecessary hardship on the traveling public.
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> "Southwest Airlines has long been known as "The Low Fare Airline." Our low fares on every SWA flight continues to afford many the opportunity to utilize air travel. It would

not be in the best interest of the traveling public, if unnecessary costs to SWA were reflected in higher passenger fares."

"In summary, SWA feels that the burn tests peak heat release rate deviation is very slight and the area affected by the tape so small that it will not adversely affect safety or the safe operation of the aircraft listed above. We also feel the cost of removing the tape could contribute to higher passenger fares which would not be in the best interest of the traveling public.

A summary of Southwest Airline's petition was published in the Federal Register on March 23, 1995 (60 FR 9422). One comment was received. The commenter, the Air Line Pilots Association (ALPA) , opposes the granting of the petition. The commenter contends that the peak heat release value for the delivered ceiling panels of 67.69 kilowatts per square meter is "significantly above the maximum," and that "materials should be as far below the maximum as possible." The commenter also contends that granting the exemption to assist Southwest in maintaining their status as "The Low Fare Airline" could result in "further violations in a variety of other areas."

The FAA's analysis/summary is as follows:

Amendment 25-61 (effective August 20, 1986), "Improved Flammability Standards for Materials Used in the Interiors of Transport Category Airplane Cabins," added stringent new flammability requirements based on heat release in §25.853(a-1). The requirements were applicable to material combinations used to form the large surface areas of interior cabin furnishings in newly type certificated transport category airplanes with a passenger seating capacity of 20 or more. The purpose of this amendment was to improve fire safety in passenger cabins by increasing survival time in a fire through delaying the onset of "flashover." ("Flashover" is a condition in which materials in the cabin reach their auto-ignition temperature and are ignited spontaneously.) The test procedure and success criteria were placed in a newly created Part IV to Appendix F of part 25. The success criteria for this test are that the average of the tested specimens cannot have a peak heat release of more than 65 kilowatts per square meter and the total heat release over a two minute period cannot exceed 65 kilowatt-minutes per square meter.

Concurrent with the issuing of Amendment 25-61, the FAA issued Amendment 121-189, which required, in pertinent part, that airplanes manufactured on or after August 20, 1990, and used in part 121 operations had to comply with the provisions of § 25.853 in effect on August 20, 1986.

On August 25, 1988, the FAA issued Amendments 25-66 and 121-198, both effective September 26, 1988. The amendment to part 25 added a new requirement for smoke emission testing applicable to the same interior components that are required to be tested to the heat release requirements promulgated in Amendment 25-61. Additionally, some refinements to the

heat release test procedure in Part IV of Appendix F were adopted. The procedure and success criterion for the smoke emission test were placed in a newly created Part V of appendix F. The success criterion is that the average specific optical smoke density (D_S) for the tested specimens cannot exceed 200. Because of the success criteria associated with parts IV and V, these requirements are frequently referred to as the 65/65/200 flammability requirements.

Amendment 121-198 was promulgated in conjunction with Amendment 25-66. The pertinent difference from the requirements promulgated by Amendment 121-189 was to require that airplanes in part 121 operations manufactured on or after August 20, 1990, had to comply with smoke emission requirements as well as the heat release requirements, i.e., the provisions of § 25.853(a-1) in effect on September 26, 1988.

On July 20, 1990, the FAA issued Amendment 25-72, Special Review: Transport Category Airplane Airworthiness Standards, effective August 20, 1990. As part of the revisions to part 25 promulgated by that amendment, § 25.853(a-1) was relocated to § 25.853(c).

Regarding the Boeing Model 737-300 airplanes, the type certification basis of the airplane does not include either Amendment 25-61 or Amendment 25-66. Therefore, the airplanes may be manufactured and issued a standard airworthiness certificate without having to comply with either the heat release or smoke emissions requirements. However, the forty-two (42) 737-300 airplanes listed in the Southwest Airlines petition are being flown under part 121 operations, and were manufactured on or after August 20, 1990. These airplanes, therefore, are required by § 121.312(a)(2), to comply with the 65/65/200 heat release rate and smoke emissions standards.

The heat release rate and smoke emissions numbers for the ceiling panels installed in the Southwest Airlines airplanes are a peak heat release of 68.9 kilowatts per square meter, a total heat release of 28.95 kilowatt-minutes per square meter, and a D_S of 73.8. This means that the peak heat release is 6% above the allowed limit, while the total heat release is 55.5% below the allowed limit, and the smoke emissions are 63.1% below the allowed limit. Therefore, the delivered material combination does not literally comply with the requirements because one of the values exceeds the allowable limit by a small percentage, although the other two values are well below the allowed limits.

The candidate replacement ceiling panels, with a different sound dampening tape, have a peak heat release of 52.23 kilowatts per square meter, a total heat release of 61.9 kilowatt-minutes per square meter, and a D_S of 96.51. This material combination literally complies with the regulations since each of the numbers is below the corresponding 65/65/200 limit. The peak heat release result is 19.6% below the allowed limit, the total heat release is 4.8% below the allowed limit, and the smoke emissions are 51.8% below the allowed limit.

In comparing the two sets of panels, the peak heat release value for the delivered panels is inferior to that of the candidate replacement panels. The total heat release and smoke emissions

values for the delivered panels, however, are significantly better than those for the candidate replacement panels. The question arises as to whether the compliant candidate replacement panels are an improvement over the delivered non-compliant panels.

The FAA considers that of the two heat release rate criteria, the total heat release is the more significant criterion for improving fire safety. In fact, the peak heat release rate criterion was not included in the original notice of proposed rulemaking (NPRM) 85-10. The proposal to add the peak heat release rate criterion was added in NPRM 85-10A simply to preclude the installation of thin materials that did not have enough mass to contribute significantly to the total heat release of the cabin materials, but which could be quite flammable for a short period of time.

The location of the non-compliant materials in the ceiling of the 737-300 airplanes significantly reduces the likelihood that any short-lived transient heat release just above the acceptable level would cause other materials located lower in the passenger cabin to ignite. Balanced against this situation is the significant reduction in the total heat release rate exhibited by the installed panels, as well as the lower amount of emitted smoke, compared to the candidate replacement panels.

Regarding the applicant's assertion that the delivered panels were inadvertently installed by the Boeing Company, the FAA discussed the issue with a representative of the Airworthiness Department of the Boeing Company. The explanation given was that shortly before the part 121 deadline for installing materials compliant with the provisions of §25.853 in effect on August 20, 1988, the drawing(s) for the installation of the sidewall panels and other large surface area furnishings of the passenger cabin was revised to specify compliant parts. However, the drawing(s) for the installation of the ceiling panels was overlooked and therefore not revised. The oversight was discovered when shortages of certain materials involved in the process of assembling the ceiling panels led to the discovery that these materials were not being used on other parts in the interior. This information was then provided by Boeing to Southwest Airlines, which, in turn, prompted its petition for exemption. The FAA finds this explanation to be credible and concludes that the applicant's reliance on Boeing was reasonable and Boeing's failure to deliver compliant products was inadvertent. As noted above, it was not a requirement to have the improved materials installed in the airplanes prior to delivery from Boeing since the requirement is not in the type certification basis of the airplane.

Based upon this review, the FAA has determined that justification does not exist to mandate the replacement of the delivered ceiling panels with the candidate replacement panels. The cost savings to Southwest Airlines, while obviously important to the airline, was not a significant factor in this decision.

In consideration of the foregoing, I find that a grant of exemption is in the public interest and will not affect the level of safety provided by the regulations. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701, formerly §§ 313(a) and 601(c) of the Federal

Aviation Act of 1958, as amended, delegated to me by the Administrator (14 CFR § 11.53), Southwest Airlines is hereby granted an exemption from the heat release requirements of § 121.312(a)(2) for Boeing Model 737-300 series airplanes. Since the affected airplanes are not required to comply with § 25.853(c) as a condition of type certification, no relief from that section is needed.

This exemption will remain in effect unless superseded or rescinded.

Issued in Renton, Washington, on June 16, 1995.

/s/ Darrell M. Pederson
Acting Manager, Transport Airplane Directorate
Aircraft Certification Service